ABBE (R.)

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The Appendix "in the Interval."—A New Method of Studying its Pathology

BY

ROBERT ABBE, M.D.

NEW YORK

Attending Surgeon to St. Luke's Hospital, the New York Cancer Hospital; Assistant Attending Surgeon, Roosevelt Hospital; Consulting Surgeon, Ruptured and Crippled Hospital, Woman's Hospital, Babies' Hospital, Convalescent Home for Babies

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THE APPENDIX "IN THE INTERVAL."—A NEW METHOD OF STUDYING ITS PATHOLOGY.

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WHEN a surgeon has removed an appendix in the interval between attacks, he usually studies it, either by immersing it in alcohol and submitting it to section after days of hardening, or he makes as careful an examination of the fresh specimen as he can by trying to pass a probe into it to detect stricture, or slicing it from end to end. Either method gives little or no idea of its pathological condition.

During the past few months I have adopted another method, which has revealed a most unexpected and perfect demonstration of the exact pathology of its diseased structure and which virtually shows the causes of appendicitis in its several varieties, and demonstrates to the eye that which gives an explanation of the clinical symptoms of chronic cases.

Within a few hours after removal the appendix should be distended with ninety-five-per-cent. alcohol, through a conical nozzle of a small syringe tied tightly into its cut end by a ligature, which is tightened as the syringe is withdrawn (Fig. 1). The distended organ is then immersed twenty-four hours or more in alcohol of the same strength. It is then ready for section. If it is sliced centrally from end to end, its interior will be a revelation to the surgeon. Whereas the outside may preserve the cylindrical form of a normal appendix, and may give little or no evidence of inflammation, the interior (if the patient has had one or more attacks) will show one or several of the following conditions. These are illustrated by the

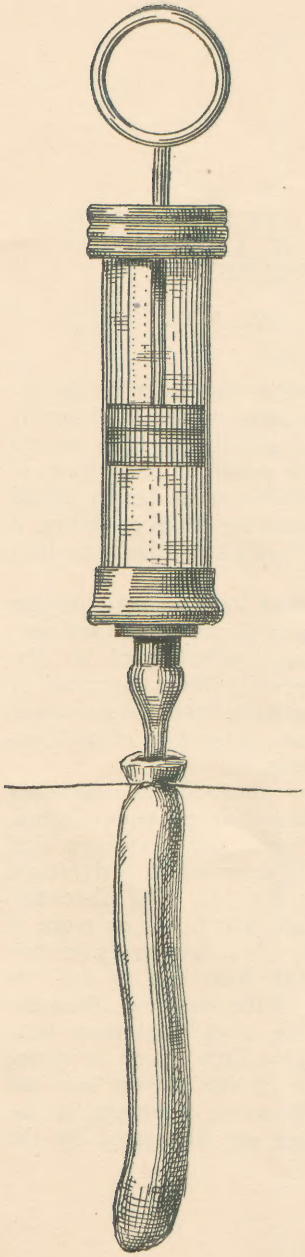

FIG. 1.

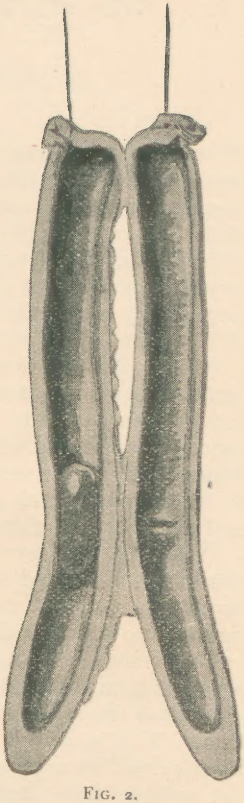

FIG. 2.

annexed cuts, selected from a considerable number of appendices removed by me during the past four months:

1st. A fæcal concretion blocking the canal (Figs. 2, 3, 4).

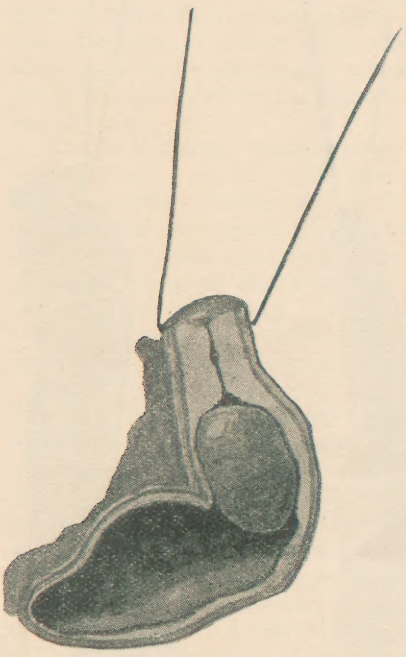

FIG. 3.

FIG. 4.

2d. Interior ulcerations (Figs. 5, 6, 7).

3d. Cicatricial strictures, often of pinhole aperture only (Figs. 8, 9, 10).

4th. Multiple strictures with intermediate pockets, containing suppurating and catarrhal products, and

FIG. 5.

FIG. 6.

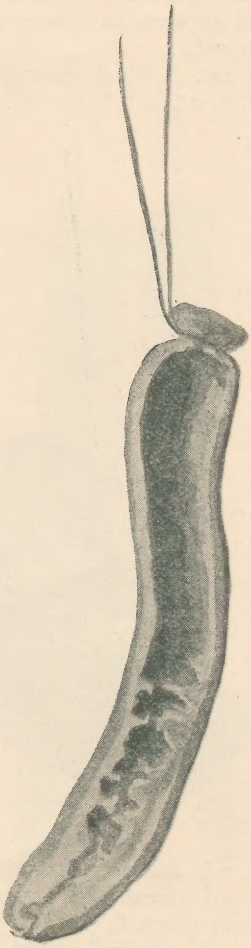

FIG. 7.

confined by greatly hypertrophied muscular and mucous coats (Fig. 11).

5th. Partial obliterating appendicitis (Fig. 12).

These five varieties are subject to infinite variations. Indeed, I find no two alike.

The condition resembles very much cicatricial strictures of the urethra in some cases. As far as my study goes, I am led to assign three distinct causes which may result in the obstruction which leads to ultimate gangrene, perforation, or rupture following distention:

First, a catarrhal inflammation alone may be followed by stricture, as in the urethra. This form has been distinctly classified by Dr. W. H. Draper as coincident with or a sequel of an attack of grippe. In a paper read by him two years since, before the Practitioners' Society of New York, he ventured the explanation of a lurking remnant of influenza in the appendix, as a reasonable way of explaining the increase of appendicitis in recent years.

Second, a natural point of flexure in the appendix (due usually to an abbreviated point in its mesentery) leads to an arrest of its fæcal contents, which, being inspissated, grow into a concretion. In Fig. 2 this is well shown, and opposite to it a sacculation is commencing, which does not show on the outside, but which was ready to perforate at an early opportunity. This patient had been treated for a year for ovarian inflammation, the symptoms being due to the appendix, as shown by her normal ovary at operation.

Third, an otherwise healthy appendix may be the subject of circular ulceration, from no apparent cause other than probably microbic origin. These after healing are probably the cause of the sharp annular strictures so often seen.

Doubtless many of the cases of spontaneous cure after frequent attacks pass into the stage represented in Fig. 11 (which I find quite common), in which an

extreme proliferation of the mucous coat ultimately obliterates the canal—as in Fig. 12. But the patient runs the gauntlet of many attacks in which distention of the intermediate pockets may and often does cause fatal results.

The final obliteration of the canal, moreover, does not always rid the patient of pain. The lady from whom the specimen shown in Fig. 12 was removed had been disabled from household duties by appendical pain for more than a year, yet I found merely this little atrophic organ—which evidently in its cicatrization must have included nerve filaments which disturbed her whole system.

In another case—that of a child aged eleven, whose appendix was almost the counterpart of the one shown in Fig. 11—only one distinct attack of appendicitis had ever been known, and that occurred two weeks prior to operation; but it was evident that perhaps years had been required to produce the chronic changes shown—and this disturbing organ, unrecognized, might well have been the cause of the very puny, ill-developed condition of the child, who scarcely seemed larger than a girl of seven years.

The examination of the concretions is of much interest. Microscopic study of the unstained and stained bits taken from the centres of many of them shows that they are uniformly composed of the inspissated remnants of the contents of inflamed appendices. The pus cells make up the greater part; exfoliated epithelium cells nearly all of the remaining bulk; and, added to these, a smaller part composed of minute bits of meat fibre (nearly digested) and starch cells, with occasional crystals of decomposition—all welded together by a great variety of bacterial *débris*. In the presence of the latter we see the evidence of nature's effort to remove the incarcerated residuum of decomposition and inflammation, and it is possible that it might be accomplished in months or years of waiting.

But who can afford to wait the perilous delay, when the surgery of the day offers safe and speedy relief? It is now possible by recently perfected methods to re-

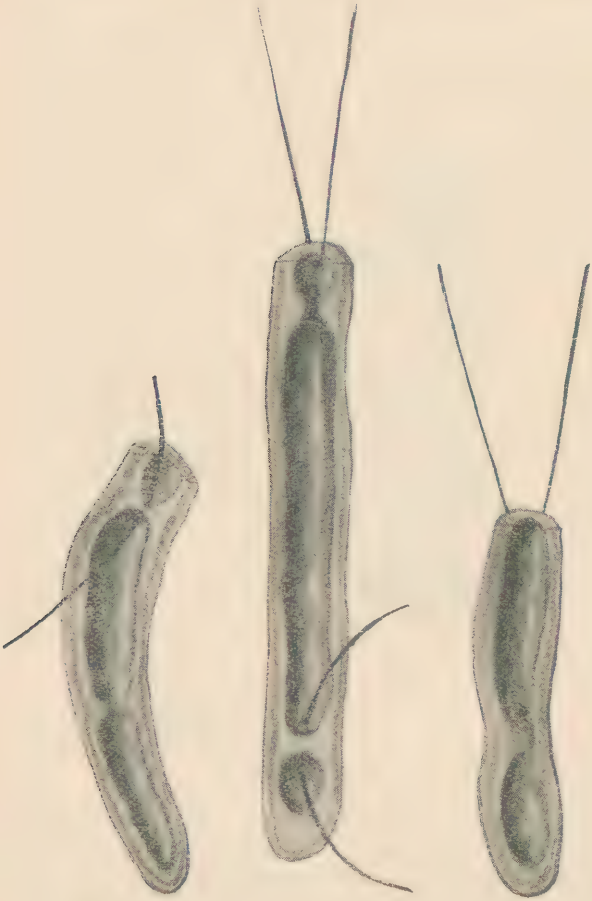

FIG. 8. FIG. 9. FIG. 10.

move these dangerous chronically inflamed organs through a small incision (usually one inch long), and leave the abdominal wall practically normal both in appearance and function.

FIG. 11.

FIG. 12.

The foregoing demonstration of the interior pathological appearance of the appendices, which, when seen at operation, often present little or no gross appearance of previous inflammation makes it the im-

perative duty of the surgeon at operation to remove such an organ, whenever the clinical history of a previous attack has been clear, and to subject it to this method of preparation after removal.

In Fig. 4 we have an excellent illustration of several phases of appendicitis. The specimen was removed from a boy of fourteen years, who had suffered four grave attacks during two years. The operation was done during an interval. A concretion of the usual type was found incarcerated in a sacculus at the end of the organ. The alcohol distending the specimen passed through a pinhole opening in a tough stricture, and it was thus hardened in just the condition representing the inflammatory distention of an acute attack, there having been also a stricture at the point where the appendix was cut off.

One may read the past and future history of the trouble in the pathological picture here presented. Perhaps at the next acute congestion of this organ the stricture would become closed; the sealed cavity at the end would then become an abscess, which in rupturing would discharge the concretion.

Regarding these so-called "concretions," it is not well enough understood that, though of variable degrees of hardness, they are not limestones. Concerning their presence, one may repeat the remark of the scientist lecturing on the earth's development, who said: "There are many to whom it is still a mystery how the apple came to get inside the dumpling." The presence of a tight stricture prevents the epithelial scales which are constantly being shed by the lining membrane from being discharged into the colon. This accumulation is by no means a slight matter, and as the laminated deposit increases and dries out it becomes a source of irritation, which adds pus cells to the deposit. Thus the absence of food products from the microscopic examination may be a very striking feature of the stone's composition.

The development of the diseased appendix, therefore, may be said to pass usually through these stages:

First, a catarrhal inflammation of the lining mucous membrane.

Second, irregular narrowing of the calibre, with hypertrophy of the mucous and muscular coats.

Third, strictures.

Fourth, imprisoned food, desquamated epithelium, and pus, forming concretions.

Fifth, obstruction at the stricture, distention, perforation, abscess.

This explanation will, I believe, be found to include the great majority of cases, but does not exclude appreciation of the rarer ones resulting from simple flexion of the organ, or those resulting from internal ulceration.

13 West 50th Street.